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public schools, the newly organized school board having declined to accept it, by vote of fourteen to one.

DR. ARTHUR D. HIRSCHFELDER, of Johns Hopkins Medical School, has accepted the appointment of professor of pharmacy and director of the pharmaceutical department of the University of Minnesota.

DR. J. M. SLEMONS, associate professor of obstetrics at Johns Hopkins Medical School, has been appointed head of the department of obstetrics and gynecology and director of the woman's clinic in the University of California.

MR. HAROLD S. OSLER has been elected assistant professor of agronomy, in charge of the crops section at the University of Maine.

MR. J. B. DEMAREE, recently of the Ohio Agricultural Experiment Station, and for the last six months engaged in the study of plant rusts at the Indiana Experiment Station, has accepted a position in the State College of Pennsylvania as instructor in botany.

PROFESSOR KRUSE has accepted the call as director of the Hygienic Institute at Leipzig as successor of Professor Hofmann.

DISCUSSION AND CORRESPONDENCE

THREE ICE STORMS

DURING the last two weeks in February, 1913, two ice storms which were of rather unusual meteorological interest, were observed at Blue Hill Observatory (10 miles south of Boston, Mass.). An "ice storm" (*glatteis*, *verglas*) occurs when raindrops falling on trees and other objects, cover them with ice. In both cases the ice storms began at the base station (400 feet below the summit and one half mile northwest) nearly three hours earlier than at the summit. The first ice storm occurred during the night of February 16-17. Throughout the sixteenth at the summit of Blue Hill, the wind was southerly, with the temperature in the forties (F.). In the middle of the afternoon, a low fog appeared over Boston. By sunset, this fog filled the entire Boston basin and was beginning to send long fingers southward through the notches in the

Blue Hill Range and up the low Neponset Valley. Not till three hours later did the fog overtop Great Blue Hill with its accompanying northeast wind and freezing temperature. The warm south wind, whose lower boundary had now risen above the hill, continued above the lower wedge of cold air and with its rain supplied the material for the ice storm below.

The second storm began in the morning, February 27, and continued for twenty-four hours, the ice attaining a thickness of one inch. The night before, at a temperature of 26° a fine thick snow had set in with a brisk southeast wind. In the early morning, the temperature passed 32°, the snow changing to rain. At 5:20 A.M. the first influence of a cold current of air from the north was recorded on the thermograph at the base station (temperature fell rapidly from 35° to 31°). Not till 8:15 A.M. did the wind on the summit swing to the north, lowering the temperature to that of the base station. The warmer air current continued above, unabated, for at 9 P.M. the light rain had become heavy (rain temperature 32.3°) and the cold, northeast wind (27°-31°) had increased to brisk. On the following morning in the warm sunshine and rapidly rising temperature, the ice melted off the trees so rapidly that for half an hour the sound of falling ice resembled that of a heavy hailstorm.

Another ice storm deserving mention here was that of February 21-22. The weather map of February 21 showed an ice storm in progress over a strip of country 100-200 miles wide, extending from northern Texas to southern Michigan. The next morning, this ice-storm belt was shown as a strip about forty miles wide from northern Vermont to southern Maine. The geographical distribution of the different forms taken by the heavy precipitation throughout New Hampshire was particularly interesting as viewed from a train window two days later. At Jackson, N. H., the precipitation on February 22 had been about seven inches of snow and one inch of ice pellets. Southward, this snow-covering decreased rapidly into a thin, compact blanket of ice pellets and frozen rain, ice appearing on

the trees within 20 miles south of Jackson. At 40 miles south of Jackson, the smaller trees were so loaded with ice that they were bent to the ground and many branches had been broken off. Ten miles farther south, at Rochester, N. H., there was no more ice on the trees nor snow or ice on the ground. This great difference in ice and snow covering was the result of a difference in temperature of not more than 5° (31° Jackson, 33° – 40° Blue Hill).

In each of these three cases the daily weather maps showed an area of high pressure ("high") directly north of a low pressure area ("low"), both moving slowly eastward, each more or less in the way of the other because of the prevailing tendency of a "high" to move east-southeast and of a "low" to move east-northeast in these parts of the United States. These cyclones ("lows") were thus amply supplied with cold air in their northern quarters. The ice storms occurred in the region where the normal warm southerly winds on the east side of the cyclones overlapped the cold north and northeast winds on the northern side.

CHARLES F. BROOKS

BLUE HILL METEOROLOGICAL OBSERVATORY

A PHLEBOTOMUS THE PRACTICALLY CERTAIN CARRIER OF VERRUGA

EXPERIMENTS on laboratory animals with bloodsucking arthropods, looking to the solution of the problem of verruga transmission, have been under way at Chosica, Peru, in charge of the writer, since May 15, 1913. A study of the bloodsuckers occurring in the verruga zones has been going on for a longer time. At first the writer strongly inclined to the theory of tick or other acarid transmission, but the trend of the investigation has been to make such transmission seem very improbable of late. No argasid ticks have been found to occur commonly on mammals in the verruga zones, and ixodid ticks will hardly explain the night infection. The experiments in feeding, biting and subcutaneous injection of animals with the bloodsucking Gamasid mites of the vizcacha, which seemed at first most promis-

ing, have so far entirely failed of result. A resurvey of the situation had therefore become necessary in order to start out on new lines.

Culicids, *Simulium*, Tabanids, *Stomoxys*, fleas, lice and bugs are all precluded either by their extended occurrence, by their dependence on man, or by their day-biting proclivities. The question of punkies and like small gnats remains. The writer's attention has recently been drawn to the possibilities of *Phlebotomus*, chiefly through the investigations recently published by Marett on the genus in the Maltese Islands. His results are most impressive and suggestive in this regard. The habits of the early stages and of the flies, as described by Marett, fit so well into the conditions obtaining in the verruga zones that the conclusion was irresistible that a *Phlebotomus* must be the carrier of verruga. Hitherto there has been no record of the occurrence of *Phlebotomus* in Peru, or anywhere in the Pacific coast region of South America.

Ceratopogon and other genera of Chironomidae with mouth-parts more or less adapted for bloodsucking occur at night both in and out of the verruga zones. They were therefore contraindicated. Night collecting at Chosica, just below the limits of the verruga zone, has never disclosed *Phlebotomus*, and as these gnats are never seen under ordinary circumstances in the daytime the writer determined to investigate the verruga zone by night in order to demonstrate if possible the existence of *Phlebotomus* therein. Accordingly he passed the night of June 25, 1913, at San Bartolomé in the verruga zone of the Rimac valley. The result was that, besides *Ceratopogon* and other Chironomids, several specimens of *Phlebotomus* were actually found. The natives call all nocturnal gnats *titira*, considering that most of them bite, but certain of the more intelligent distinguish the true *titira* as the *Phlebotomus* sp., stating that it has white wings.

The true explanation of the oft-repeated facts that verruga is confined to deep and narrow canyons, with much vegetation, heat and little or no ventilation, evidently lies here. The flies of *Phlebotomus* avoid wind, sun and full daylight. They appear only after sunset,